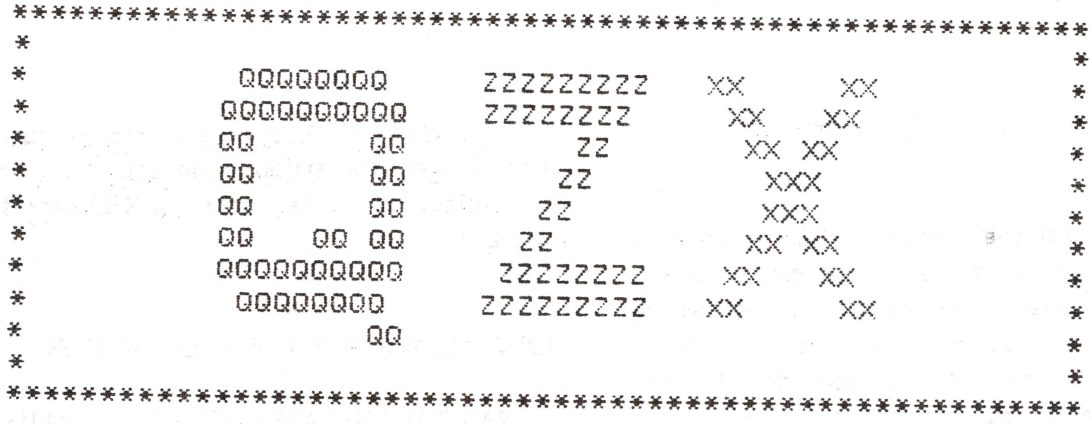
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The Journal Covering Amateur Radio & Sinclair Computers
ZX80; Micro-Ace; ZX81; TS1000, 1500, & 2068; QL; Z88
Alex. F. Burr, K5XY, Publisher
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Las Cruces, New Mexico
88001

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EDITOR'S NOTES

K5XY

Well the printer finally gave me a price for printing QZX which repeated one he had given me months earlier. It was wrong, but was the same as had been charged in July. I am not going to keep this Editor's note opening going until he quotes me the same price two months in a row. Enough is enough. This is the end of this topic.

The mention in QST noted last month finally paid off. We got two new subscibers this past month. It has been a long time since that many new hams have appeared.

Bob, WA6DLI, sent a long list of interesting commercial ham programs for the Spectrum computers. The TS2068 can be easily made to emulate a Spectrum with the addition of a new ROM. If there is sufficient interest I will be glad to summarize in QZX the list Bob sent. Most of it is obtainable from Technical Software, Fron, Upper LLandwrog, Caernfon, Gwynedd LL54 7RF, Great Britain.

Bob also reminded me of the best selling book, "The Cuckoo's Egg" by Cliff Stoll about the catching of German hackers looking for secrets in US computers by telephone. Cliff is a ham and ham radio played at least a little part in the book. Unfortunately Sinclair computers did not play a part.

QZX FRIENDS

K8NZZ -- Wilbur renewed and made a contribution to the postage fund.

LU8MAD -- Guillermo, prolific QZX author, can sometimes be reached on packet by connecting to his home BBS, LU1MUM via LU1MBB-1 on 14.105 MHz.

KA6USJ -- Eric, a new subscriber, mentions that he has a TS2086 and 1 1/2 TS1000's. (That 1/2 must be interesting.)

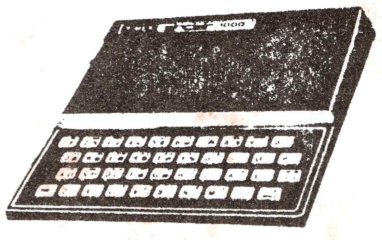
WA6DLI -- Bob sent a color picture of his latest acquisition to go with his Sinclair collection, a Lisa (running a MFJ packet program).

UNCLASSIFIED ADS

WANTED: UNCLASSIFIED ADS for publication in QZX. Cost is 1 cent for each keystroke (characters, blanks, etc.). Payment must be included with order. This is an excellent way to sell your program or unwanted equipment, ask for help, or find a specific program. Send your ad with payment to QZX, 2025 O'Donnell, Las Cruces, NM 88001.

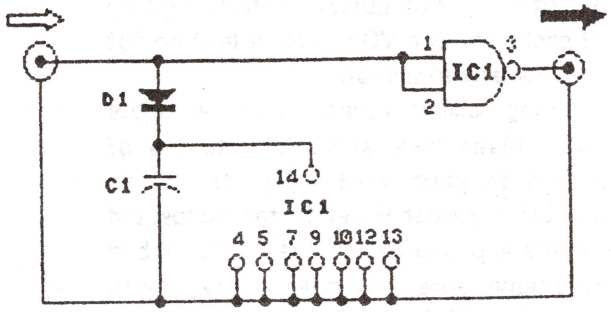
QZX Discount: 15% discount on all orders mentioning QZX. T & C Services (address in ad in this issue).

FOR SALE: TS1000, TS1016 16 K RAM, power supply, TV switch, and five program tapes. No books. Keyboard does not work. $10 (plus $1 to ship) now. Price will go up if I fix it. By mistake I ordered two copies of Technical Tidbits (see review in October issue). You can have this one for $4 postpaid. Alex. F. Burr, K5XY, 2025 O'Donnell, Las Cruces, NM 88001.



SHORT CIRCUITS

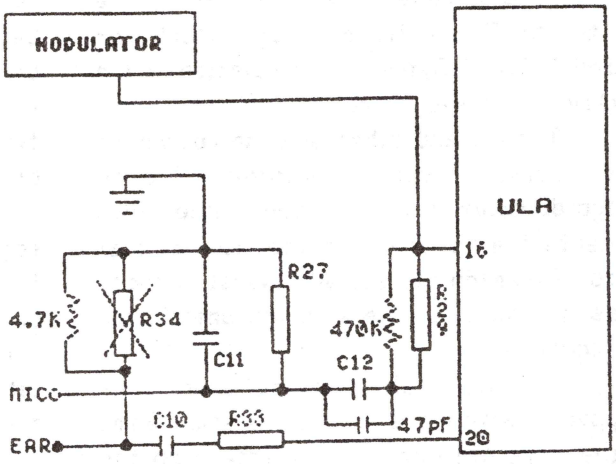
QL SYNC INVERTER



C1 = 10uF, 16V IC1 = 74HC00 or MEF40116
D1 = 1N4148

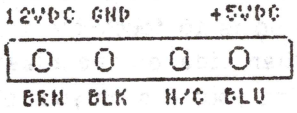
Use between composite monitor and QL to provide proper sync. Signal powers circuit!

MODULATOR

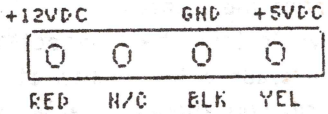


Modify your TS1000 or ZX81 with this circuit and say good-bye to all those tape loading problems! Add only those components whose values are listed.

TOS (SILVER AVENGER) SUPPLY



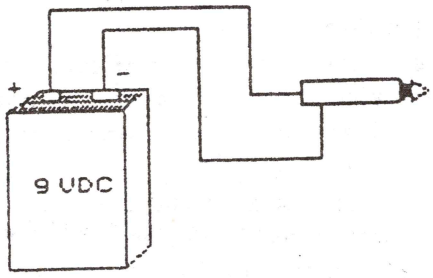
FRONT VIEW



AMDEK DRIVE SUPPLY

Here's how to overcome the overheating problem in "Silver Avenger" 3-in disk drive power supplies: Use Amdek drive power!

Modem Power



Here's a quick and dirty 9-volt power supply for that 2050 modem or anything else that needs it. Battery should be alkaline and the plug is a 'mini.'

(716) 834-1716
T & C SERVICES
20 LIBERTY TERRACE
BUFFALO, N.Y. 14215
(716) 834-1716
Call or write for a free catalog of products for the Timex Computer

QL KEYBOARD PROBLEMS

R. A. HILSMANN

This article is adapted from one written by R. A. Hilsmann and which appeared in SMUG Bytes, the newsletter of the Sinclair Milwaukee Users Group.

The QL and other Sinclair computers often suffer keyboard problems due to design difficulties in the ribbon cable which connects the keyboard to the main circuit board. Hilsmann has solved several of these types of problems. Here is his description of a couple.

At one club meeting a member dropped in with his QL under his arm. Some of the keys did not put characters on the screen. Dead keys. Because I had a similar problem with my keyboard some time ago (control key did not work), and I was able to fix the broken trace in the membrane, he thought I would be more knowledgeable about fixing such a problem. After inspection of his keyboard membrane on his QL, I found a totally different problem. But more about his keyboard problems later. Let me first write about how I had taken care of my keyboard problem.

As usual, the most difficult item when fixing electronic devices, or any other problem for that matter, is to find what is broken and where.

If only one, or a few, keys on your QL keyboard do not work, chances are one of the circuit traces, either on one of the ribbon cables, or on one of the membrane halves, is at fault.

A problem one encounters with the QL keyboard membrane is that all of the traces are on the inside, sandwiched between three layers of plastic. Yes, three layers, the two outside layers have the circuit traces printed on them with conductive paint, the one in the center keeps the two layers apart so that the traces do not touch. There are large holes in the center layer, which are located under the keys, so that when a key is pressed the traces make contact. All this is, unfortunately, held together with a rather nasty adhesive.

Using the probes on an ohm meter (VOM) direct is therefore not possible; but, because this is about the only way to find a broken circuit trace, the problem seems to be insurmountable. Not quite. Attach another type of probe to your VOM probes (but do not blame me for any injuries).

Using jumper wires, attach a single edge razor blade (new and sharp) to one of the probes on your VOM. Clip the other probe, using a jumper wire, to the suspected trace on the exposed end of one of the ribbon cables, making sure you make contact with the conductive coating.

While following the trace from the ribbon cable, use the tip of the razor blade to pierce gently through the plastic into the conductive coating (circuit trace). Be sure to hold the razor blade in line with the trace, not across. Otherwise you would surely cut the trace. You also do not have to use a large amount of pressure. All the tip of the razor blade has to do is to touch the trace coating on the other side of the plastic sheet. While keeping your eye on your ohm meter when using the blade, you should be able to see when you get a reading. This will give you an idea of how deep to press the razor blade tip through the plastic.

If you now follow the suspected trace, inserting the blade a few inches at a time along the trace, you should be able to find the section where the break happened. Working your way back until you get a reading again will give you an even better idea where the precise spot of the break is located. Now to the really tricky part, fixing the break.

It has been suggested (and practiced) to scrape away the plastic layer until you expose the conductive coating. But to me this is like trying to touch up a coat of paint by shaving away the layer of wood the paint sticks to.

I had fixed my keyboard membrane by

cutting a section out of the other membrane half, the one opposite rom the one having the broKen trace, and precisely opposite the breaK. This of course is only possible if there are no traces right across from the damaged section.

Using a razor blade, I made a cut next to, and following the trace, not deep enough to penetrate both membrane halves, and just long enough to get the tip of a knife wedged under the top two layers. Inserting a tip of a dull knife into the cut, I separated the top two layers from the one having the bad circuit trace on it. Lifting the two top layers, I now cut about a half inch section out of those two top layers, just wide enough to expose the circuit trace to be fixed, and without damaging the half holding the broKen trace.

The next step was to remove the adhesive from the broKen trace. This can be accomplished by carefully scraping the adhesive away. Do not use solvents because solvents would also remove the trace coating which you still need to fix the breaK.

I now cut a narrow strip of aluminum foil, just as wide as the trace itself. Using conductive paint, I now glued the strip of aluminum onto the broKen trace, bridging the damaged section. After checKing the repaired section for continuity with an ohm meter, a strip of clear adhesive tape was used to cover the hole again after the paint had dried.

My friend's problem with his AL Keyboard membrane was quite different. His (and later on mine and others) Keyboard membrane had a breaK right across the area where the ribbons turn into the membrane layer. Both the ribbon cable, and the membrane halves, are made out of one sheet of plastic. The problem in this case was that the adhesive, which naturally contains some sort of solvent, had removed all, or most, of the plasticizer out of the plastic membrane. (Plasticizer is the compound which keeps plastic flexible.) Thus maKing it brittle right on the edge where the ribbon continues into the membrane layer.

Because this area has a sharp bend in it, a slight flexing of the membrane when a Key is pressed, and is subject to heat generated in the computer itself, the section tends to develop tiny cracKs right across all the traces coming from the ribbon section.

In my friend's case the breaKs had already gone all across the two ribbons, and there was nothing I could do to save it. Therefore I now inspected my ribbons and found the cracKs just beginning on the outer edge. I tooK some conductive paint and lots of tape and secured the ribbons to the metal plate which now holds the membrane to the Keyboard, preventing all flexing, and reinforcing the area under stress.

Since this episode, I have seen three more QL's with similar Keyboard problems. All I can say is, be aware! Of course it would be a good idea to Keep an extra membrane on hand, There are also new types of membranes offered today which probably will not have similar problems in the future.

T AND PI ATTENUATORS

WA3QLW

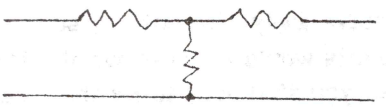
Here is a short program which will help you determine the values of resistance to use in attenuators. The program asKs you for input impedance, the output impedance, and the attenuation desired. It then calculates the three resistors needed to construct either a pi or a T attenuator with the characteristics you desired.

As in previous programs, most of the lines deal with input and output requirements. But there are three areas of computation here. The first calculates a minimum loss for the impedances selected. This is done in lines 60 and 70. Two groups of lines, following line 120 and line 170, do the actual resistance calculations.

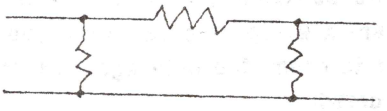
Pairs of lines at lines 30, 50, and 100 illustrate a good programing technique. The

first line of the pair asks for some input.
The second of the pair prints that input right
back out so that you can check that the
intended value got into the computer.

```
  10 PRINT "T AND PI ATTENUATORS"
  20 PRINT "ENTER INPUT IMPEDANCE IN OHMS"
  30 INPUT Z1
  35 PRINT Z1
  40 PRINT "ENTER OUTPUT IMPEDANCE IN OHMS"
  50 INPUT Z0
  55 PRINT Z0
  60 LET T=9SQR9Z1/Z0)+SQR(Z1/Z0-1))*2
  70 LET M=10LN(T)/2.3025
  80 PRINT "MINIMUM PAD LOSS IS ";M;"DB"
  90 PRINT "WHAT PAD LOSS IN DB IS DESIRED?"
 100 INPUT L
 105 OUTPUT L
 110 LET L=10*(L/10)
 120 PRINT "t PAD ATTENUATOR"
 130 LET R3=2*SQR(L*Z1*Z0)/(L-1)
 140 LET R1=Z1*(L+1)/(L-1)-R3
 150 LET R2=Z0*(L+1)/(L-1)-R3
 160 GOSUB 250
 170 PRINT "PI PAD ATTENUATOR"
 180 LET R3=(L-1)/2*SQR(Z1*Z0/L)
 190 LET T=(L+1)/(L-1)/Z1-1/R3
 200 LET R1=1/T
 210 LET T=(L+2)/(L-1)/Z0-1/R3
 220 LET R2=1/T
 230 GOSUB 250
 240 PRINT "PRESS 1 TO CONTINUE"
 242 IF INKEY$="" THEN GOTO 242
 244 LET A$=INKEY$
 246 IF A$="1" THEN CLS
 248 GOTO 10
 249 IF A$="" THEN GOTO 290
 250 PRINT "R1=";R1;"OHMS"
 260 PRINT "R2=";R2;"OHMS"
 270 PRINT "R3=";R3;"OHMS"
 280 RETURN
 290 STOP
9998 SAVE "ATTn"
9999 GOTO 10
```



T



P I

This is a good program that can save one a lot of calculation in both audio and RF work. However there are a couple of rough spots in it. See if you can figure them out and propose changes in the program before it is discussed in QZX again.

BITS AND BYTES

145 The following poke can be used on the TS2068 to to take it out of the CAPS mode. POKE 23658,0.

146 The following command will pause the TS2068 untill any key is pressed. PAUSE 0.

147 The following poke can be used on the TS2068 to change the time that a key must be held down before it repeats. POKE 23561,X where X can go from 1 to 35. Most people prefer 10 to 15 for text.

148 The following poke can be used on the TS2068 to change the delay between successive repeats of a key being held down. POKE 23562,X where X can go from 1 to 5. Most people prefer 3 for text.

149 Try using USR 15002 to get out of an infinite loop on the TS2068 without crashing.

150 The following poke can be used on the TS2068 to enter your own basic lines into RAM if you are using cartridge S/W that can be stopped by the break key. POKE 23750,0. To return to the catridge ROM, enter POKE 23750,128.

151 The following poke can be used on the TS2068 to give the starting ink color. POKE 23693,56.

152 The following poke can be used on the TS2068 to give a line number of 0. POKE 26711,0. Use POKE 26711,1 to change line 0 to 1.

153 The following poke can be used on the TS2068 to use all 24 lines. POKE 23659,0. This makes the program unstoppable. Use this poke with INKEYS only, INPUT resets. To reset use POKE 23659,2.

154 The following poke can be used on the TS2068 to make lines disappear. POKE 26710,255. It makes the line number greater than 9999. POKE 26710,0 will reset the line numbers.

155 The following poke can be used on the TS2068 to get a question mark cursor displayed in input statements. POKE 23617,236.

156 The following lines will allow you to change paper and ink colors on the TS2068 without clearing the screen.

```
DIM A$ (704)
PRINT AT 0,0; OVER 1; PAPER 1; INK 6; A$
```

157 The following lines can be used to print on lines 22 and 23.

```
1 PRINT#1; AT 0,2; "HI"
2 PRINT#2; AT 1,5;"BY"
3 PAUSE 0
```

158 If your TS2068 is having a hard time loading a program, try typing LOAD "" CODE RAND USR 33792.

159 On the TS2068, the line

```
INPUT LINE A$
```

will prevent the computer from placing "" on the screen when waiting for input. A bug in the system will prevent you from using "stop" with this system, but you can use cap-shift-6 to stop the machine.

160 On the TS2068, the line

```
PRINT PEEK 23635+256*PEEK 23636
```

will return the starting address.

161 On the TS2068, BASIC starts at 26710.

73, K5XY

QZX presents the best software & hardware projects available for the radio amateur. While the contents are believed to be accurate, no warranty is extended on any program or project. No investigation has been made of the claims or reputation of any advertiser. It would be greatly appreciated if all correspondence requiring an answer would be accompanied by a self-addressed stamped envelope (SASE). Copyright by QZX, 1990. All rights reserved, photocopying by permission only.

```
*******************************************
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* $25 in US funds for air mail delivery.) *
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*                                         *
* City ___________________________________*
*                                         *
* State _______ Zip __________            *
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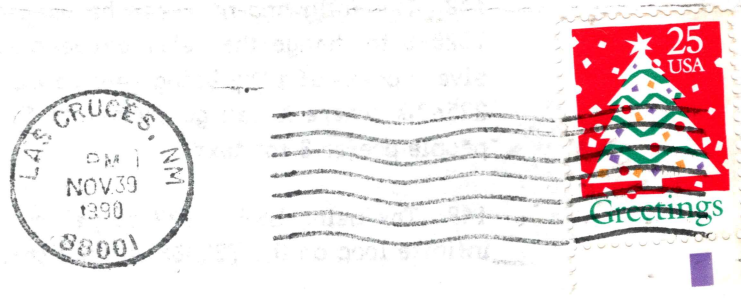

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